

# Implementing a holistic approach to a radiographer-led Hysterosalpingogram (HSG) service: A review of impact and patient perception

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## ABSTRACT

**Introduction:** Radiographer role development has touched boundaries across the multidisciplinary team and more recently branched into the field of gynaecology. Radiographers are now able to perform tasks that were traditionally performed by radiologists and gynaecologists to implement a radiographer-led Hysterosalpingogram (HSG) service. The aims of the study were to (i) implement a radiographer-led HSG service with a view to decreasing waiting times. (ii) To determine ladies perceptions and satisfaction levels.

**Method:** Local clinical guidelines were developed with the radiologist/gynaecologist and trainee HSG radiographers. A robust system of work was initiated which required maintaining comprehensive log books to record examinations performed and reports written. These were audited and compared with those of the radiologist. Audit cycles were monitored through Q Pulse to ensure good practise was maintained. Patient satisfaction surveys were developed and distributed to 100 consecutive ladies attending for HSG over a 6 month period from January–July 2017.

**Results:** The radiographer-led service has increased the number of appointment slots offered for HSG's throughout the year as the service now runs every week. HSG's were performed by 5 staff members but now only require 3 staff. A 75% response rate was achieved from the questionnaire survey and shows high patient satisfaction levels. Ladies reported being better informed about their examination resulting in decreased anxiety, concerns and discomfort.

**Conclusion:** The implementation of this service has successfully reduced waiting lists for HSG examinations from 14 to 0 weeks. The Trust has saved £15,000 on staff salaries per annum since the service started.

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## Introduction

Infertility is a prevalent condition in the United Kingdom and is reported to affect approximately 1 in 6 couples throughout the course of their lifetime.<sup>1</sup> It is widely recognised that fertility problems have a potential devastating effect on peoples' lives causing significant distress, depression and possible breakdown of

relationships.<sup>2–4</sup> The World Health Organisation (WHO, 2009)<sup>5</sup> defines infertility as “a disease of the reproductive system which results in the inability to achieve a clinical pregnancy after 12 months or more of unprotected, regular sexual intercourse.” Recent guidance from the National Institute for Health and Care Excellence guidelines (NICE, 2017)<sup>6</sup> states that patients should be offered a Hysterosalpingogram (HSG) as a first line diagnostic tool to screen for tubal occlusion to rule out any blockages of the fallopian tubes, as it is less invasive and makes more efficient use of resources than laparoscopy.

A HSG is the radiographic evaluation of the cervical canal, uterine cavity, the shape/patency of the fallopian tubes and the peritoneal cavity during the injection of a non-ionic radio-opaque

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contrast media with fluoroscopic visualisation (Fig. 1).<sup>7</sup> The first HSG was performed in 1910 and was considered to be the first specialised radiologic procedure.<sup>8</sup> To this day HSG's still remain the best procedure to image the fallopian tubes and are predominantly used in the evaluation of infertility. Other reasons for performing HSG examinations include follow up to sterilisation procedures and to assess congenital uterine anomalies. Although HSG examinations are mainly for diagnostic purposes reports suggest a possible therapeutic benefit from the flushing effect as contrast is washed through the fallopian tubes and may help increase patency.<sup>9</sup> The number of couples seeking medical help to achieve conception has risen dramatically in recent years and data suggests that fertility issues are the second most common reason for women to visit their General Practitioner (GP) NICE (2014).<sup>10</sup> It is important to note that by the time ladies contact their GP and come for their HSG examination they have already been trying to conceive for at least a year under the NICE guidelines (2017).<sup>6</sup> This is of great significance when one considers recent literature which suggests that the emotional stresses ladies with infertility face are similar to that of cancer patients.<sup>11</sup> It is clear that the impact of infertility is multi-faceted, causing a range of emotions, mainly negative, which effect key areas of ladies' lives.<sup>11,12</sup> Hence, this demand for the provision of HSG services will continue and measures must be put in place to cope with the increased waiting lists.

Role development in radiography is well recognised as it offers a quicker, reliable and effective service to patients and is continuing to find new grounds in both reporting and image acquisition.<sup>13–15</sup> Holistic radiographer-led HSG clinics were first introduced in 2000 and are now well embedded in many radiology departments.<sup>16</sup> To ensure patient centred practise in the radiology department<sup>17</sup> the staff delivering the HSG service decided it was important to explore new ways of working to enhance the quality of the service.<sup>18</sup> Staff tried to optimise the experience the ladies received by ensuring they were at the heart of the service delivery and their experiences and outcomes became the central focus for the HSG staff.<sup>19</sup> As identified by Freeman et al.,<sup>20</sup> meaningful patient engagement and involvement are key factors in improving the quality and experience of the health care provided. Hence, strategies for improvement worked “hand in hand” with recommendations from the Bengoa report<sup>18</sup> and embedded personal and public involvement (PPI) in all aspects of the work.<sup>17–19</sup>

Patient preparation is key to allowing staff to proceed with the HSG test. However, anecdotal evidence within the department identified that many ladies (on average 3 ladies every list which equated to 12 per month) were arriving for their HSG without following the correct preparation, only to be turned away without having the procedure performed subsequently leading to lost appointment slots. This was devastating for many ladies who were already stressed and anxious.<sup>12</sup> Historically, these ladies were placed at the bottom of the waiting list for HSG setting them back at least 4 months in their fertility treatment pathway. Staff recognised that the system was not making the best use of resources (leading to cancelled appointments) and more importantly, it was not

providing ladies with a high quality patient centred care.<sup>17</sup> Hence, the rationale for the study was to address this problem using a multi-faceted approach.

The aim of this study was to:

- implement a radiographer-led HSG service with a view to decreasing ladies waiting times
- To determine ladies perceptions and satisfaction levels of the service

The objectives were

- To train radiographers to perform, manage and report on HSG examinations.
- To audit all radiographer-led reports regularly to measure compliance
- To develop patient information leaflets for HSG examinations to distribute at the time of booking and again on arrival in the department
- To construct and deliver a patient satisfaction survey with the aid of Trust PPI facilitators

## Methodology

Opportunity to partake in the role extension was advertised locally within the Trust. Health Care Professions Council (HCPC) registered radiographers working at band 6 or above and with at least 3 years post registration clinical experience working in radiology were asked to volunteer. The criteria for the staff selection process was set out by the consultant mentoring radiologist (referred to as radiologist) and desirable criteria included previous experience working in fluoroscopy especially HSG examinations. Staff were subsequently selected by the radiologist. Following selection of the successful candidates, staff attended a one-day “Hysterosalpingogram Course” in The Royal Hallamshire Hospital, Sheffield. This course included lectures on HSG techniques, anatomy, congenital variants and abnormal findings, fertility and sterilisation lectures, setting up a training programme, patient experiences and trouble-shooting tips.

## Training

A robust scheme of work providing guidance on training requirements was developed jointly by the radiologist and trainee HSG radiographers. These local guidelines were devised using guidelines delivered by The Royal Hallamshire Hospital, Sheffield as a template and modified to suit the local department policies and procedures. This enabled the radiographers to undertake the radiological aspect of HSGs and allowed them to measure their performance and compliance. This was achieved through continuous auditing of HSG reports and examination doses to measure compliance with the consultant radiologist reports and examination doses. Comprehensive log books were kept by all trainee staff to measure performance and compliance.

## Implementing the HSG service

The service was developed in 2 stages by the introduction of a stringent in-house training programme to train and support radiographers to perform HSG examinations independently. Initially, the log books were completed and reports satisfactorily audited, the radiologist certified staff as competent to perform and report HSG's independently. This enabled the radiographers to complete HSG's without the need for the radiologist but with the help of a

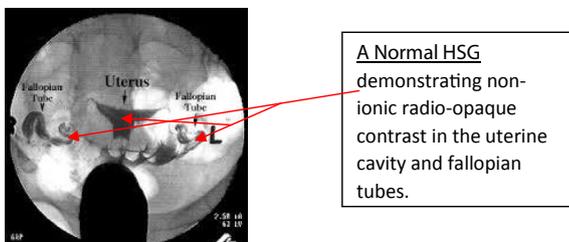


Figure 1. Image of uterus and fallopian tubes filled with contrast media.<sup>7</sup>

gynaecologist. To further improve the service the radiographers investigated the possibility of developing their skills to include the gynaecologist's role and perform catheterisation themselves. Following consultation with the gynaecologist a further in-house training programme was subsequently developed with a consultant gynaecologist during day procedure lists. An agreed system of work was developed and is illustrated in Table 1.

#### Redesigning the patient information leaflets

To enhance the service further, the HSG team assessed the patient appointment letter to determine if any information was lacking and where it could be improved. The PPI facilitators in the Trust engaged with patient focus groups which comprised of ladies of reproductive age to critique the appointment letters and leaflets before they were finalised for distribution. The original appointment letter stated the patients name, address, appointment date, time and location and then a long paragraph describing the procedure. Working with the PPI and using the Plan Do Study Act (PDSA)<sup>21</sup> (Fig. 2) as an iterative, four stage problem-solving tool<sup>22</sup> the letter format was redesigned into clear bullet points (instead of a long paragraph) highlighting words like

- essential
- necessary
- preferred

After further revision, the letter was refined using straightforward, simple and meaningful wording, without using jargon, technical terms and acronyms e.g. contraception (condoms) or abstinence/not sexually active etc.

Working concurrently with the redesign of the appointment letter, feedback from the focus group suggested that a personalised

information leaflet would help the ladies comprehension by explaining again what was required to ensure they were fully prepared and better informed for the HSG examination.

#### Patient Satisfaction Surveys

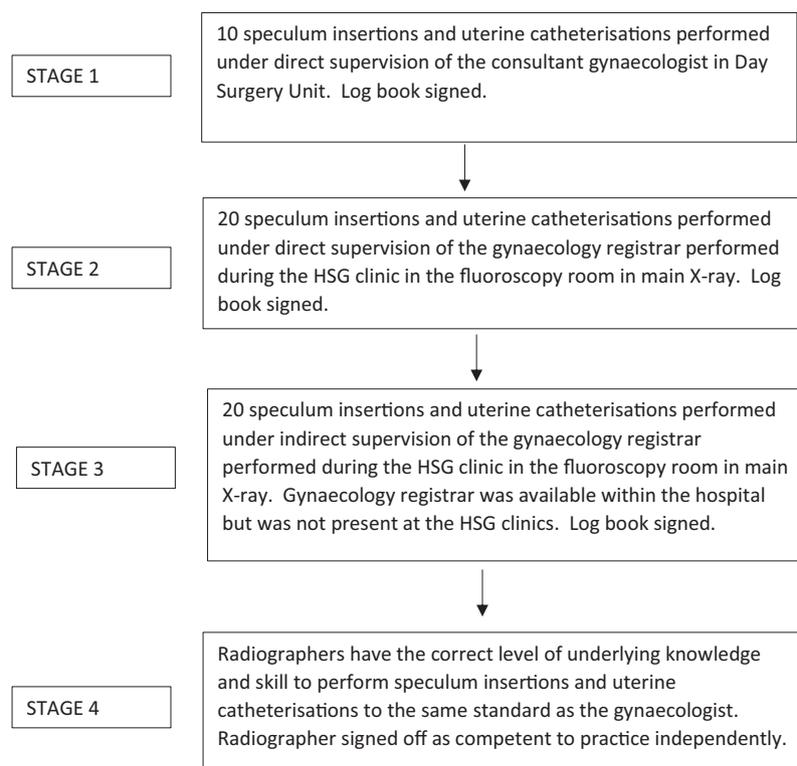
Following the implementation of these changes a questionnaire was developed in partnership with the PPI facilitators in the Trust to monitor patient perception and satisfaction levels. The questionnaire comprised of 24 open and closed questions focussing on specific areas to determine information on the ladies' perception of the appointment letter and information leaflet, waiting time in hospital, information given prior to appointment, directions to the x-ray department, instructions, care received from the radiographer and overall experience of the patient and service facilities. Initially, a pilot study was performed across 4 practising radiographic staff and feedback was sought to determine survey suitability and highlight any ambiguity. Minor amendments were made to the questions following feedback from the pilot study to improve clarity and understanding. Purposive sampling was used for the patient survey and the questionnaires were distributed to 100 consecutive ladies attending for HSG over a 6 month period from January to July 2017. The questionnaire was completed by respondents on paper copies and the data from the paper copies was transferred onto an electronic form by a single independent researcher. Ladies were asked to complete the questionnaire and either submit it before they left the department or were given the option to post them back to the x-ray department in a provided pre-paid envelope.

#### Data analysis

The data was collated with the aid of google docs ([https://docs.google.com/forms/d/1ntNvoGvm39GrMud5T8K9Dp\\_EXyxiC2l](https://docs.google.com/forms/d/1ntNvoGvm39GrMud5T8K9Dp_EXyxiC2l))

**Table 1**

Agreed system of work developed to enable speculum insertion and uterine catheterisation.



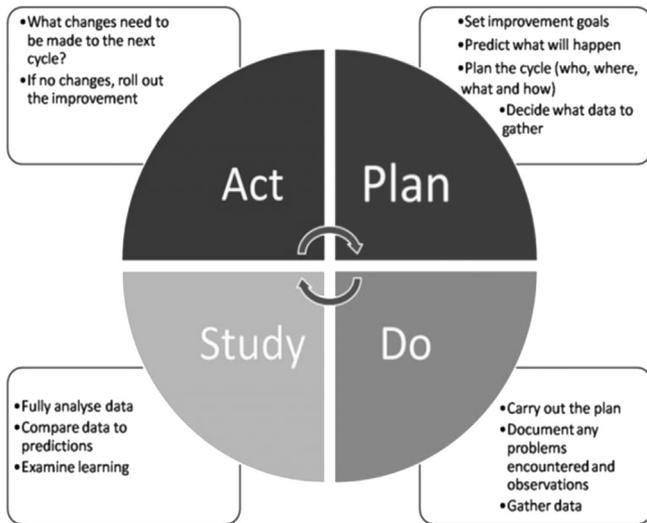


Figure 2. Plan, Do, Study, Act (PDSA) cycle.<sup>21</sup>

performed with 3 staff i.e. 2 HSG trained radiographers and a radiographer assistant ensuring better continuity and quality of care for these ladies (Fig. 3). The number of HSG examinations being performed by radiographers was immediately equivalent to the number performed by radiologists and has continued to increase as staff have gained more experience with the radiographer-led service. The HSG radiographers are also starting to train more radiographers to build capacity in-house. In addition, radiology registrars that rotate through the Trust receive formal training from the HSG radiographers. A financial saving is being made by the Trust which equates to £15,000 per annum, i.e. 1 professional activity of Direct Clinical Care (DCC) of a consultant radiologist = £10,000 per annum and £5000 for a gynaecology registrar.

Redesigning the patient information leaflets

Following discussion with the ladies, HSG staff identified various reasons for ladies arriving unprepared for the examination. The most common reason was that the ladies reported having unprotected intercourse and were therefore unable to sign the “Last Menstrual Period” (LMP) form stating no chance of pregnancy. This resulted in cancellation of appointment on the day.

Other reasons for ladies not being prepared included:

- Ladies had not read the appointment letter in detail as it appeared “too wordy”
- Letter was difficult to read
- Use of confusing terms e.g. contraception instead of condoms or radiology instead of x-ray
- Lack of clarity on the need from refraining from unprotected intercourse

Feedback from the focus group identified the need for an additional information leaflet to explain the procedure in more detail. Prior to this the ladies did not receive any additional information and were relying on internet sources prior to coming to the department. This resulted in patients being misinformed and having heightened anxiety and fears of the procedure e.g. different

pGB6VmRHmjwU/editresponses). Pie charts were created for the categorical data, bar graphs for the multiple choice rating scales and listed responses for short answer questions. This data was then verified by the 2 main researchers.

Results

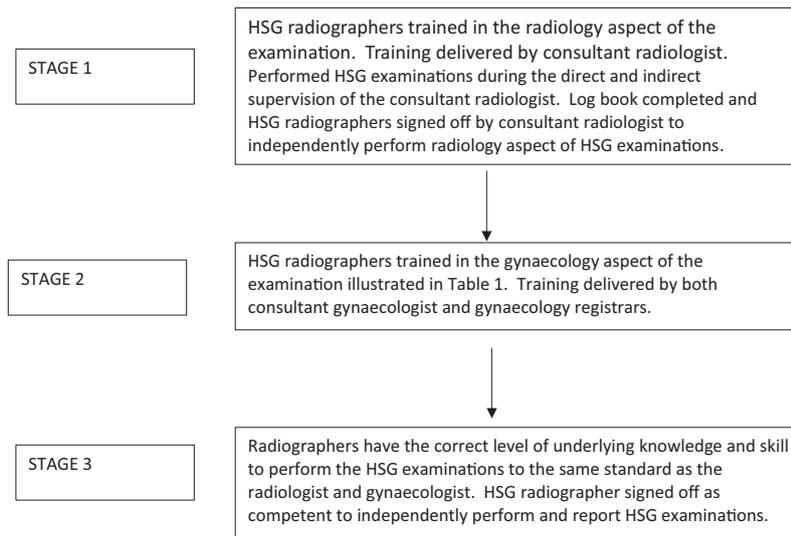
Training

Initially two radiographers were trained in HSG's within the Trust. The training took a period of three years as many difficulties and challenges were encountered along the journey. An overview of the in-house training is illustrated in Table 2.

Implementing the HSG service

HSG clinics now run autonomously and holistically every week independent of radiologist and gynaecologist input. Clinics are now

Table 2  
Over view of the in-house training programme for HSG radiographers.



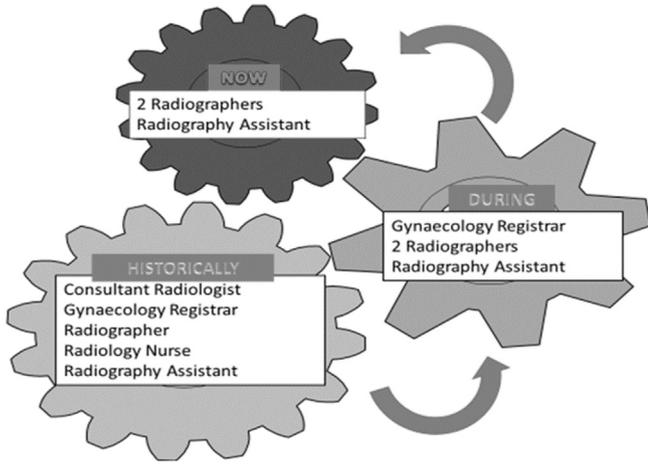


Figure 3. Changes implemented.

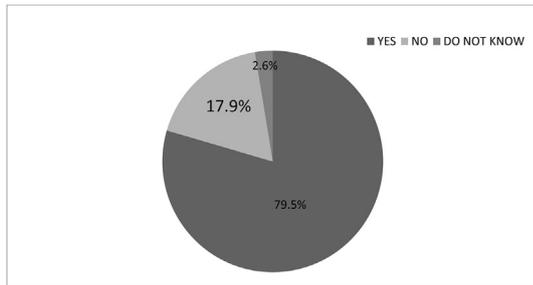


Figure 4. Were you given clear instructions about how to find the x-ray department?

types of equipment and catheterisation methods visible on the internet.

*Patient satisfaction surveys*

100 ladies were asked to participate and a response rate of 78% was recorded.

96.1% found the appointment letter clear and easy to understand whilst 93.5% of respondents believed they were given enough information about the HSG prior to the appointment. 79.5% of respondents believed they were given sufficient instruction about how to find the x-ray department (Fig. 4) while all respondents were highly satisfied with the care they received by the HSG staff (Fig. 5) When asked about the appointment letter and information leaflet results showed that 93.5% actually received the leaflet and unanimously agreed that it was useful stating it was reassuring and informative. However, 3.9% felt the details were ambiguous and

highlighted several areas for improvement (Fig. 6). In total 94.8% of respondents believed that they were given adequate aftercare information.

All respondents to the survey were highly satisfied with the care they received by the HSG staff. 100% stated that the radiographer introduced themselves appropriately and their privacy and dignity were respected as much as possible during the procedure/test. Respondents commented on the staff being very “warm and friendly, making the patient feel comfortable”, along with the staff’s “informal manner”.

The overall patient perception and measures of satisfaction of the HSG service are illustrated in Table 3.

**Discussion**

Historically the HSG service within the Trust was run with 5 staff members (gynaecology registrar, consultant radiologist, a radiographer, a nurse and a radiography assistant) present. Only one radiologist in the department performed all HSGs which led to difficulties during holiday periods, sick leave, staff shortages etc. This resulted in patient lists being cancelled/rescheduled regularly. The service lacked continuity due to the rotational nature of the staff and resulted in an incoherent HSG service which did not always run on a weekly basis. This had a huge impact on the service delivery causing a backlog of HSG appointments and the Trust was not meeting its targets (Table 4). More importantly this delayed the investigation and treatment for already anxious couples. The HSG radiographers realised that they were failing to meet their vision of delivering high quality accessible care which was responsive to all ladies. The Trust’s response to this was to introduce the radiographer-led HSG clinics in line with ‘Transforming Your Care’.<sup>23</sup> The service was then redesigned to allow for role extension of radiographic staff.

Implementing the radiographer-led programme required a lot of multidisciplinary teamwork and many difficulties were encountered. The most time-consuming aspect was the training for the radiology aspect of the HSG. Once the radiographer-led sessions were well embedded into the department and the sessions ran regularly this inadvertently increased the demand on the gynaecology registrar, to cover the HSG clinics. This resulted in further problems as gynaecology registrars were often called to cover emergencies at short notice, causing cancellations of lists (Table 5). As anticipated, this left the ladies feeling very distressed and angry with both the department and the Trust. The innovative response to further improve the delivery and quality of the service saw the radiographic staff take on the role and responsibility of the gynaecology registrar in addition to that of the radiologist. This role development is already in place in other departments and current literature suggests that this gynaecology role extension provides a safe, effective and responsive service to women and staff in radiology departments.<sup>24,25</sup> This role development enabled

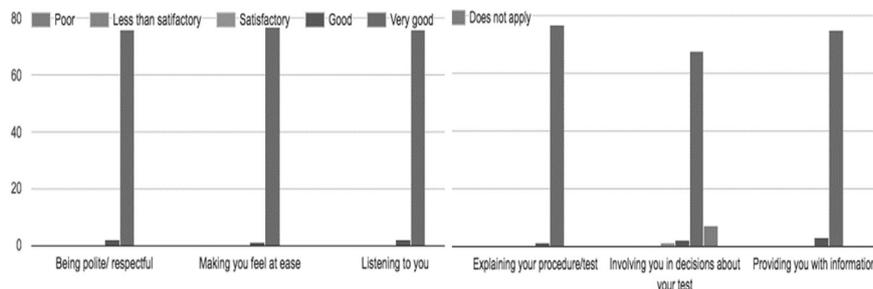
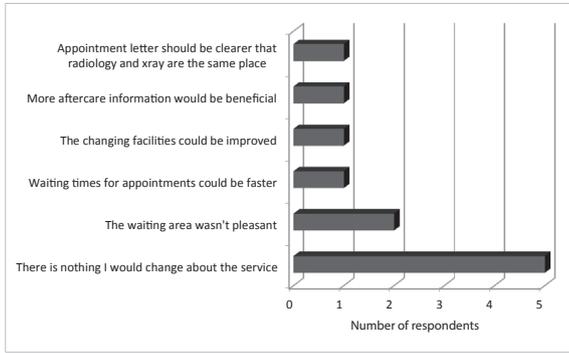


Figure 5. How good were your radiographers at each of the following?



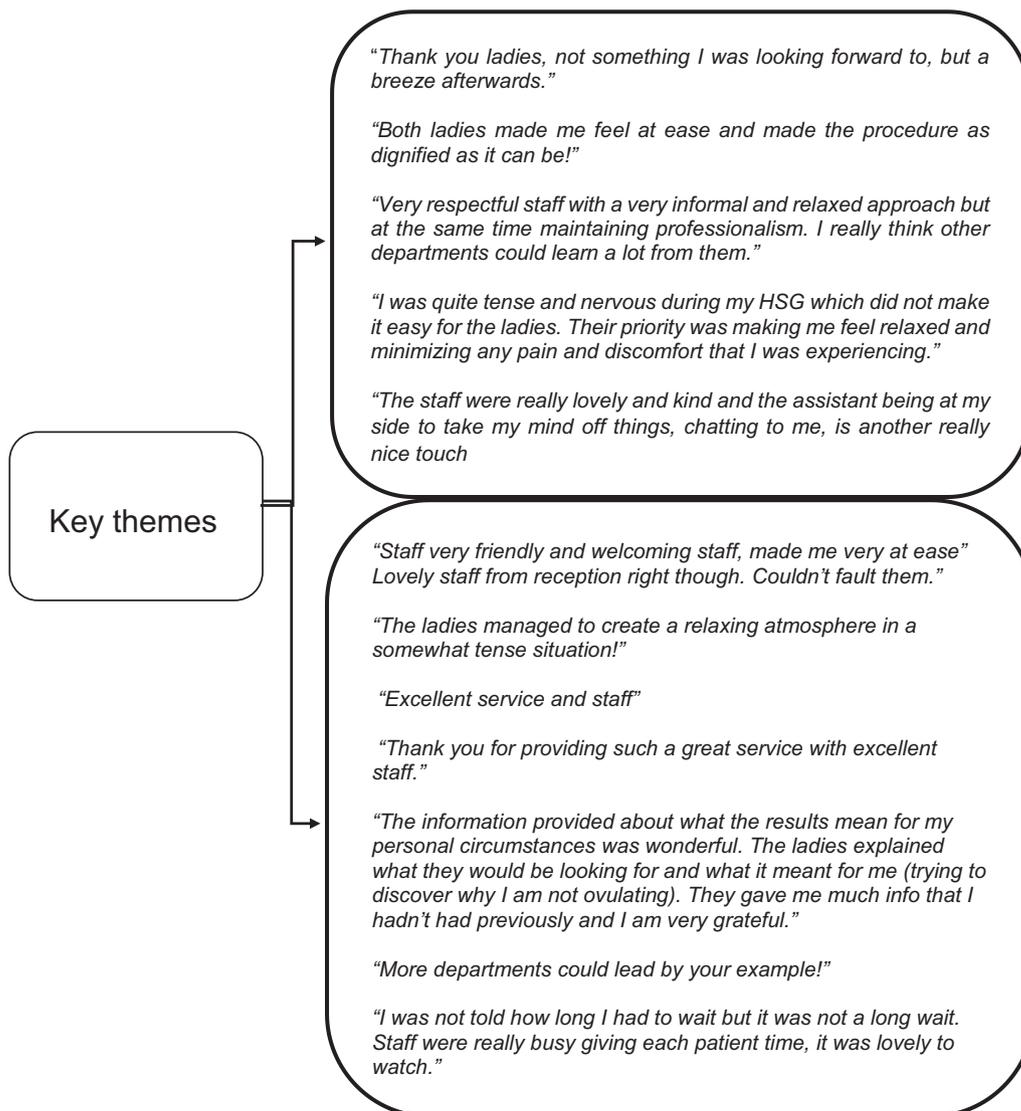
**Figure 6.** Summary of patients' suggestions on how the HSG service could be improved.

radiographic staff to manage and deliver patient lists solely with the help of a radiography assistant.

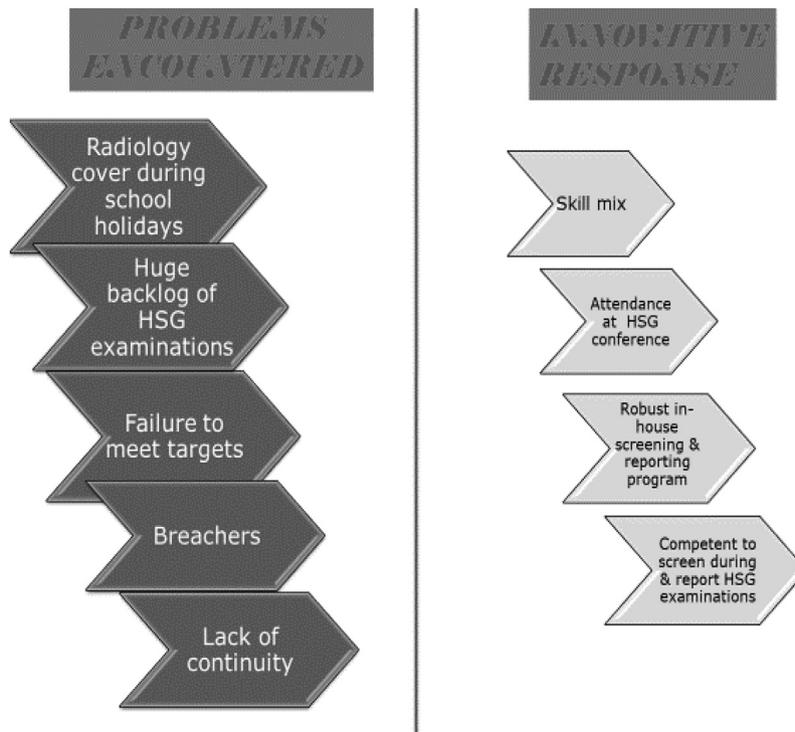
The radiographer-led service has enabled staff to manage the work load, allowing for demand and capacity and coordinate the

work flow more efficiently to ensure that all women are seen in a timely manner. Staff were also able to tailor their delivery and offer a holistic approach to the patient. This was accomplished by engaging the ladies at every stage throughout the examination. The HSG staff are now able to sustain the service consistently throughout the year and provide a service on an ad-hoc basis. This is of great importance as staff found that patients failed to appreciate the significance of the LMP form. They got very upset and irate if the examination was cancelled and needed reappointed as they were already struggling with infertility, assumed it was impossible for them to get pregnant and couldn't understand the need to confirm their LMP. The ad-hoc appointment system helped avoid further delays to their fertility treatment as even a slight delay in this process could have devastating effect on the couple both physically and emotionally. In addition to this, the recommendations from previous research were incorporated into the service design and modifications included playing gentle relaxing music in the background and infusing aromatherapy oil during the examination to reduce levels of stress and increase coping mechanisms during the examination.<sup>26</sup>

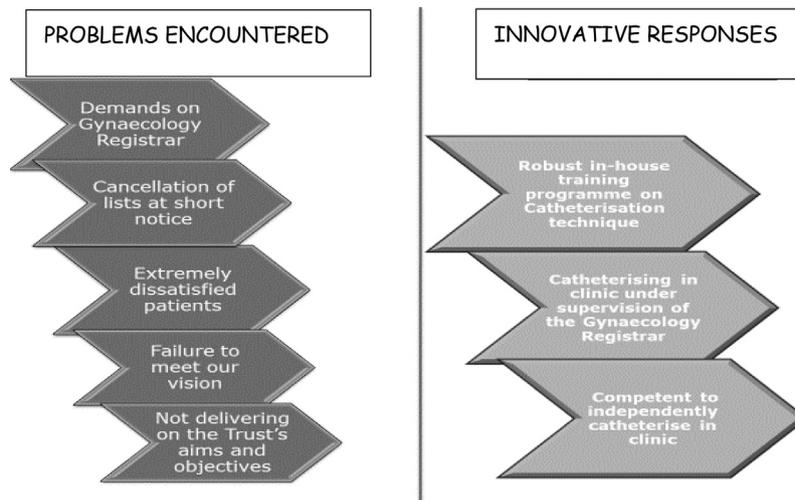
**Table 3**  
Patients perceptions.



**Table 4**  
Radiology problems encountered and staff response.



**Table 5**  
Problems encountered with increased demand on gynaecologist and staff response.



This survey highlighted several areas of improvement were required in the appointment letter and information leaflet. 3.9% of respondents felt that the confirmation details regarding the appointment would be “better placed directly underneath the appointment date.” Other respondents stated “The letter stated radiology department-not x-ray, so I was unsure as there were no signs for radiology.” To further improve the service, the HSG staff have addressed the issue with the Northern Ireland Picture

Archiving Communication System (NIPACS) team and are presently modifying the letters to resolve this issue.

Small changes were made to the information leaflet that resulted in a huge service improvement since the service began and has enhanced the overall satisfaction and perception of the service. Now patients are presenting better informed about the examination preparation and are not being cancelled and re-appointed due to having unprotected intercourse.

As the HSG service is now well established an audit cycle has been introduced through Q Pulse to audit the radiation dose to develop Local Diagnostic Reference Levels (DRL) and ensure staff are working well within the National (DRL). Both regionally and nationally there have been recent publications advocating the need for more patient centred care.<sup>17,27,28</sup> It is important to gather information regarding ladies' perceptions of radiology services for continual improvement to flourish. To date no previous studies have been identified that address these issues within the HSG service. Findings from this study highlight benefits such as enhanced patient care through the ladies being better informed about the examination resulting in decreased anxiety, concerns and discomfort.<sup>29,30</sup>

As this HSG service has been so successful, it has been extended across a satellite hospital within the same Trust facilitating localised provision for many more ladies. Current work is underway to improve the patients journey through the service by designing a 'HSG patient journey video' which will be available on the Trust's intranet and the ladies can access this along with other useful resources through a link which will be available on their appointment letter.

Further research is planned to investigate anxiety relieving methods using the State-trait anxiety inventory to better assess the cognitive response to anxiety in these ladies. As mentioned previously, HSG examinations are often associated with high levels of anxiety and research has identified that anxiety induced psychophysio responses can result in fallopian tubal spasms and have been implicated in false tubal occlusion diagnosis.<sup>28</sup> A general need within healthcare to consider the patient more holistically has been identified and this is what the HSG staff strive for.<sup>11</sup>

## Conclusion

To conclude, the introduction of this service has shown great benefits for all involved. Primarily, the patients are seen in a timely manner as waiting lists have been reduced. It is now a more responsive service to the patient's needs as appointments can be rescheduled immediately if the patient has not followed the preparation instructions properly. Ad hoc clinics are run if required.

In addition to this, the Trust are saving £15,000 thousand per annum on staff wages and are now meeting waiting list targets.

Furthermore, HSG staff have enhanced job satisfaction and a real sense of achievement. Recognition has been received from the Trust and HSG staff are proud of what they have achieved.

The radiologist and gynaecologists are now freed up to do other specialised examinations and start new initiatives within their specialist field e.g. Early pregnancy clinic and family planning clinic.

## Recommendations

The holistic approach to radiographer-led HSG service is highly successful and well received by the patients. It is recommended that radiographer-led HSG sessions should be implemented in all imaging departments, especially where waiting lists are prohibitive. Radiographic staff should continue to explore innovative ways to continually improve the service in their department. Further works for this team includes obtaining a Patient Group Direction (PGD) for administering antibiotic cover so that the HSG radiographers can administer this directly to the ladies that require it instead of relying on gynaecologist to write a prescription which the ladies then have to take to their pharmacy. 3483

## Conflict of interest

None.

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